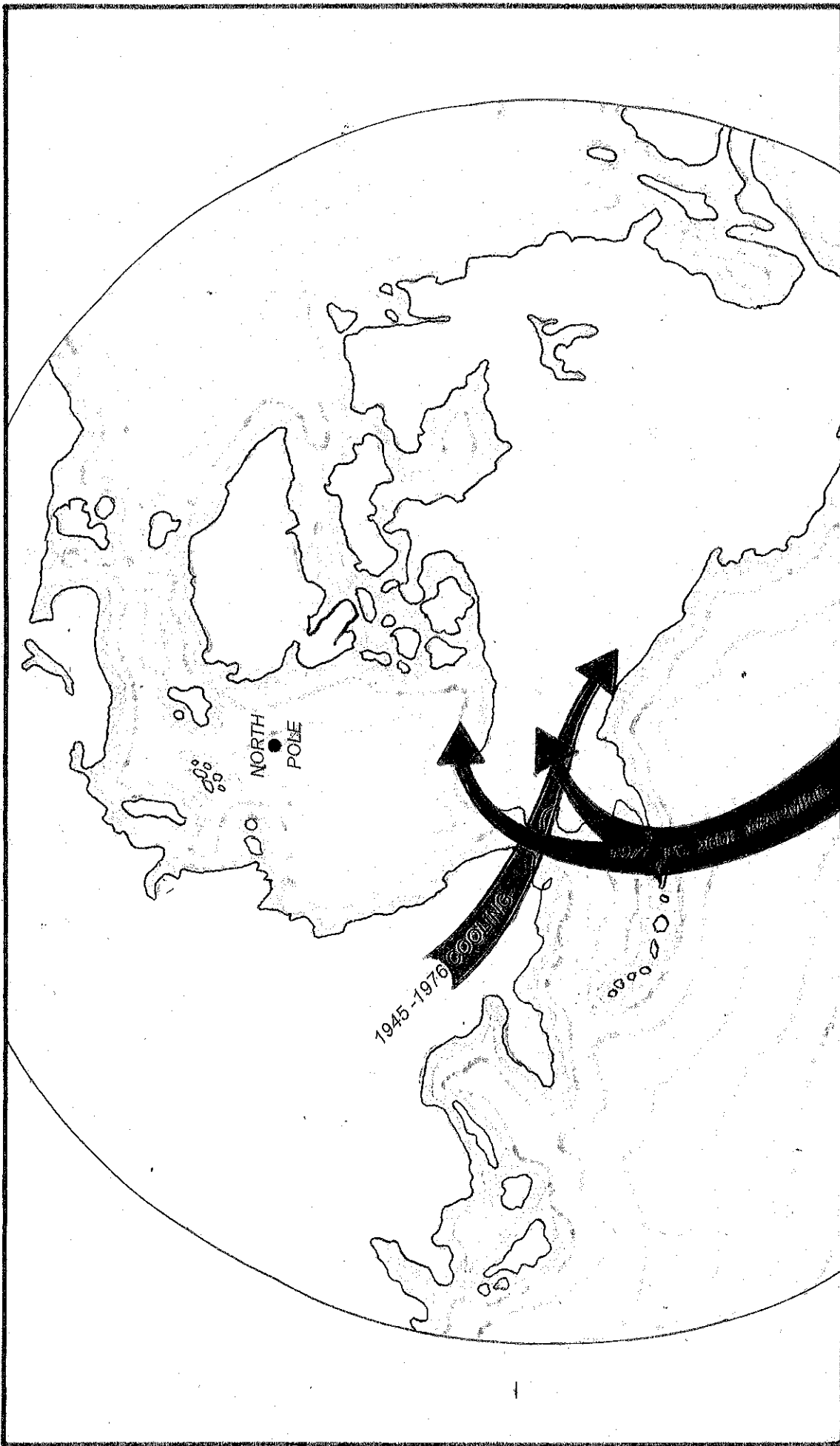


ALASKAN WINTER THERMAL INFLUENCES



## Global Warming Commentary

By Dennis Nottingham, P.E.

As a boy in Montana, I was periodically hired to pick rock from farm fields as a measure to prevent equipment damage. This strenuous work often at summer temperatures over 90°F quickly guided me to a better education. One question I always had was "Where did all these rounded rocks come from?" The farmers' answer was always that the Indians historically used them to hold down teepee edges. The real answer, of course, turned out to be "from glaciers some 20,000± years ago," since the last glacial advance stopped in Montana before starting a long retreat, which continues to this day. "Was global warming starting thousands of years ago?" With recent times better measuring devices, data collection and analysis now shows the variable nature of weather, especially temperatures, which appear to be generally warming.

For some areas of Alaska a weather record of some 100 years allows a more detailed look at winter thermal conditions. For Fairbanks, "Freezing Index" or accumulated degree-days below 32°F is one way to look at trends. By accumulating freezing index variation from mean, new curves vividly show winter warming or cooling (see graphs).

For some reason a 30-year period of rapid winter cooling from 1945 to 1975± radically changed to winter warming at that time which has continued to present day. Alarm over "global cooling" has now changed to alarm over "global warming" over the last 60 years. This era is termed by some to be a period of "regime change" and not closely related to slow warming trends.

By viewing Fairbanks Freezing Index graphs there might be in the long term, by discounting "regime change," slow winter warming. The "regime change" shows radical cooling followed by radical warming over a short period of about 60 years, more or less, from 1945 to the present. However, all this data is in the short term and very approximate at best in the long term.

The concern over "greenhouse gases" is now of popular interest. Apparently up to 1950 there was virtually no interest or measurements made in this area. The 1990s saw more measurements and interest, especially in CO<sub>2</sub>.

Better technology now allows quantification of a wide range of gas and weather variables. CO<sub>2</sub> apparently has higher concentration near the earth's surface decreasing with altitude. This brings into question accuracy and consistency of methods, means and analysis of this gas and others especially for long-term comparison. "Is there a sound standard way to quantify CO<sub>2</sub> comparisons?" As discussed previously, short-term concern by some in the past over a short 30-year period of "global cooling" was premature.

This lesson teaches that thermal and other physical trends need to be examined over long periods using only the best and most consistent data available.

Research is not a favorite subject of many politicians and those few that support such efforts are to be commended.

However, politicians have a point when some funding requests for research are not well founded and have no practical value in their eyes. On the other hand, it is imperative that appropriate "global change" research be funded to add to continuing base knowledge. For example, "standardized" CO<sub>2</sub> measurements at various locations in Alaska might be worthwhile.

There are so many "hypotheses" related to warming in Alaska that it is difficult to truly believe what is real or imagined. Obviously Alaska is affected in some way by:

- 1) Solar energy, sun spots, albedo, etc.
- 2) Warm ocean currents
- 3) Jet stream changes
- 4) Various atmospheric gases and vapors
- 5) Volcanic and other dust and smoke
- 6) Many others

Historically, one thing we do know is "There will be climate change." Life on earth over time has had to adapt with survival going to those who could adapt. Farmers have long known about changing weather and have accounted for changes by growing improved and adaptable crops.

In Alaska, our small population and industry can probably do little to change global climate, but there are some things we can do. A starting point might include:

- 1) Establish and fund research goals such that we can contribute to global climate knowledge. Knowledge brings power and will point toward direction for adaptability.
- 2) Adapt capital improvement technology that addresses new conditions such as erosion control and ground thawing.
- 3) Adapt agricultural improvements that account for expected changes including improved forestry, moose habitat programs and new agriculture.